THE IMMIGRATION OF LEPIDOPTERA TO THE BRITISH ISLES IN 1983

By R. F. BRETHERTON* and J. M. CHALMERS-HUNT**

1983 was another year of abundance. Recorded numbers of many species exceed those of 1982; but some of this was partly due to successful local breeding from early arrivals during the long spell of warmth and drought in July and August, the results of which are hard to separate with confidence from primary immigrants. There were also a large number of probable or possible immigrants of resident species. These have been marked with a star in Appendix II. For the first time records from Guernsey, Channel Islands have been included. These are valuable not only for their own sake, but also for comparison with the pattern of those on the mainland.

The event which attracted most public interest was the abundance of *Colias crocea* Fourc. This has been covered by special inquiries which are reported in Appendix III. The species was certainly commoner than in any year since 1949, though its numbers did not approach the phenomenal total of 36,000 estimated for 1947. Of *C. hyale* L. or *C. australis* Verity, however, it is possible to accept as reasonably confirmed only some half dozen among the many probably erroneous reports based on misidentifications of *C. crocea* f. *helice*. Unfortunately no specimens are known to have been retained. There were also many sightings of *Danaus plexippus* L. scattered near the south coast from Scilly to Sussex and one in S. Wales, seven sightings of *Nymphalis antiopa* L. widely spread in date and place, and of single *Lampides boeticus* L. in Somerset and in Guernsey.

Among the scarce moths, over 40 records of *Mythimna loreyi* Dup. gave the highest annual number yet known. About 1,000 *Rhodometra sacraria* L. greatly exceeded those since the "great Vestal year", 1947. *Agrius convolvuli* L. with over 500 reported, probably had its best year since 1945. *Mythimna vitellina* Hbn. was again abundant in west Cornwall, possibly as a result of temporary establishment as well as large immigration, but was not unusually common elsewhere. Of *Heliothis armigera* Hbn. there are over 20 records, widely spread but very closely dated in late September, the most since at least 1950. *Diachrisia orichalcea* F., which has become less rare in recent years, scored ten, mostly near the coasts of West Sussex and Hampshire, and there were three examples of *Eublemma ostrina* Hbn. at Portland, Dorset in June. Other rarities, of which there were single captures were *Thaumetopoea processionea* L., only the second British record, trapped with a

*Folly Hill, Birtley Green, Bramley, Guildford, Surrey, GU5 0LE.
**1 Hardcourts Close, West Wickham, Kent, BR4 9LG.

Lymantria dispar L. on 19 August at Mawnan Smith, West Cornwall; *Dysgonia algira* L., the third British example near Swanage, 23 September; *Cryphia raptricula* D. & S. at Dungeness, East Kent, 20 June; *Ochropleura fennica* Tauscher at Rugby, Warwicks, 14 August; and *Macdunnoughia confusa* Steph. at Dover, East Kent, 29 July and Stockton, Warwicks on 31 August. A specimen of *Hypena obsitalis* Treitschke had probably hibernated here after arriving in 1982; in the Channel Islands, where it is resident, it is frequently found in numbers in winter in such places. Finally, there was an addition to the British list: the Noctuid *Ochroleuca leucogaster* Frr. by J. T. Radford at Walberton, West Sussex, 17 October. This somewhat resembles *O. plecta*. It has been found on the west coast of France as far north as Morbihan, and may previously have been overlooked as an immigrant to the south coast of England.

The winter of 1982/3 was unusually mild, and this accounted for a number of early records which were probably of insects which had survived it. Thus a fresh *Heliothis peltigera* D. & S. which entered a house at Sheviock in East Cornwall on 26 January may have resulted from larvae which were widely found in the previous September and October. The probably hibernated example of *H. obsitalis* at Rye on 6 March has already been mentioned, and a single example of *Macroglossa stellatarum* L. seen at Brighton, Sussex on 4 April may have had a similar origin. There were also at least half a dozen sightings of *Vanessa atalanta* L. in January, March and early April which strongly suggest winter survival as adults or just possibly as pupae. There was, however, no long distance immigration such as sometimes occurs early in the year.

On 16 April, the mild weather gave place to a long spell of sub-normal temperatures, which lasted throughout May and in eastern England almost to the end of June. This greatly delayed the emergence of most resident species, and was presumably unfavourable to breeding by such immigrants as arrived in that period. The generally north west, north or north easterly winds were, however, broken several times by short spells of south west and later south or south east airs from the continent which favoured their arrival. Thus in the last few days of April south west winds brought a few *V. atalanta, Agrotis ipsilon* Hbn., *Nomophila noctuella* D. & S., *Autographa gamma* L., mainly to Sussex, and probably the first *Rhodometra sacraria* L. to Surrey; the commoner species arrived in larger numbers in mid May. From 3 to 6 June, with a south and south east air stream, there were interesting additions: the first thin but widespread influx of *C. crocea* and *Cynthia cardui* L., *Orthonama obstipata* F., *Spodoptera exigua* Hbn. and *Udea ferrugalis* Hbn. This was repeated in greater numbers in the middle of the month, with variety given by three *Eublemma ostrina* Hbn. at Portland, singles of *Acherontia atropos* L. in Cornwall, *Agrius convolvuli* L. in Furness, *C. raptricula* in

Kent, *M. vitellina* in Pembrokeshire, and *M. loreyi* in Sussex. Another influx in the last week brought many *C. crocea, V. atalanta, C. cardui.*

Through July and August south Britain and much of western Europe experienced a long series of anticyclones with drought and high temperatures both by day and by night. Winds were mainly northerly, but interspersed with gentle breezes from the south and south west, which were favourable to immigrants from these directions. In the middle of the month these were rather few, and appear from their species content to have originated mainly in north France or the Ardennes and western Germany, including several of our resident species such as *Autographa bractea* D. & S. and *Pelosia muscerda* Hufn. A very large and varied immigration took place, however, on 24 July and succeeding days, headed by the first considerable wave of *R. sacraria*, many more *C. crocea* and *C. cardui*, two clearly newly arrived *N. polychloros*, several *Colias hyale* L. and the first *M. confusa*, as well as many more *S. exigua, O. obstipata*, and peak numbers of *A. gamma* in traps on the south coast. From that date onwards the separation of primary immigrants from the offspring of early arrivals whose development has been hastened by the hot weather becomes difficult. It is, however, clear that there was a remarkable influx in west Cornwall about 19 August, which produced the rarities *T. processionea* and *L. dispar* with other scarce immigrants and the first main waves of *A. convolvuli* and *M. vitellina* began to come in, though these reached their peak with a further burst of immigration which included the second *M. confusa* and *R. sacraria* in the last week of the month.

Over most of England the long warmth and drought ended abruptly in the last days of August. September and October were wet and variable, with successive depressions most of whose winds originated in the north Atlantic. The numbers of most immigrant species fell sharply, and are hard to interpret. There were large peaks of *A. gamma* and *N. noctuella* in coastal traps, and continued good numbers of *A. convolvuli*; but the rather few records of other species in the first three weeks probably resulted from local breeding. From 23 to 30 September there was a very large, widespread and varied influx which included at least a dozen of the scarcer species, with the only records of *D. algira, O. leucogaster,* all the *H. armigera*, most of the sightings of the first *Mythimna unipuncta* and apparently fresh waves of *R. sacraria, A. convolvuli* and *M. vitellina*; survivors of these accounted for many records in the first week of October. Some of these immigrants may have been more or less reinforced by local breeding from arrivals in July and August; but the general indication is of a massive movement from a long distance to the south or south west. Meteorological records confirm that some or all arrivals 22/26 September and 1/4 October could have come from Madeira or the Canary Islands. There

appears to have been no further considerable immigration in October, though records of the common species, especially of *V. atalanta, C. cardui* and *C. crocea* were fairly numerous throughout the month. The season effectively closed with an unusually warm first week in November, when *U. ferrugalis* and *O. obstipata* reached almost their highest numbers probably as a result of local breeding in their third or possibly fourth generations. A disappointing feature of the year was the apparent absence of any movement from Scandinavia to Scotland across the North Sea.

The butterflies had a good but not outstanding year, apart from the great abundance of *C. crocea*. The small invasion of *D. plexippus* clearly took place about 24 and 25 September, with probable survivors in Scilly in October, where some north American birds are said to have been present. The coincidence of date of the September invasion, with the arrival of so many other scarce immigrant species of clearly south western origin does, however, strongly suggest the Canary Island or the newly established colony in Madeira as more probable sources for the *D. plexippus.* The few sightings of *N. antiopa* are too scattered both in place and date to permit even tentative conclusions about their origin. *V. atalanta*, after the overwintering examples already mentioned, had small influxes until the middle of June, after which it shared in small numbers in all the later general immigrations, when several were seen to come in from the sea or were found in light traps. Its local breeding does not seem to have been outstanding, though it gave considerable results through October, with the last at Beatham, Westmorland on 5 November. A fine ab. *klemensiewiczi* was caught at Gwithian, West Cornwall on 16 August (WGT, *Ent. Gaz.* **34**:236). *C. cardui* L. showed a rather similar pattern, but with relatively larger immigrations in mid June and late July, and heavy local emergences throughout August. But there was poor penetration both inland and northwards, with only a single record on the Isle of Canna and only two in Orkney about 22 July, though over thirty larvae were found there on 16 August. October records were few, with the last on 22 October at Prawle, South Devon.

Among the scarce moths, the *M. loreyi* were mainly concentrated in West Cornwall between 19 August and 7 September, but there were records elsewhere both earlier and later. Local breeding or even establishment has been suggested for this species, as for *M. vitellina*, in West Cornwall. The absence of any June records of it there may well be due to lack of local observation at that time. It was found at Peacehaven, East Sussex on 17 June, and it may be significant that it recurred there on 12 and 20 September. But the finding of wild larvae of both these species is urgently needed for a proper understanding of their British status.

The pattern and timing of the huge abundance of *R. sacraria* requires some discussion. Over 1,000 were reported, nearly all at

light, from some 70 localities. These were mostly coastal and in the southern counties, but they reached up the east as far as Spurn Point and Scarborough in Yorkshire and in the west to Westmorland/Furness, with two examples at Gartlea, Dunbartonshire and two near Oban in Argyll and an unconfirmed report in the Isle of Mull. Inland it was numerous in Surrey and reached up the Midlands in strength to Warwickshire, with inland records in Wales in Brecknock as well as near the coast in Monmouth, Glamorgan and Pembrokeshire. In Ireland it has already been reported from cos. Dublin, Cork and Kerry. No larvae were reported anywhere.

After a few examples noted in April and in June, the first immigration began on 15 July and became considerable in the last week; with overlap into the first week of August about 30 were recorded, mostly in Hampshire and West Sussex. There was a wider and larger influx in the latter part of August, and scattered single records through mid September which may have represented offspring of the July arrivals; but the total for the year did not exceed 160 by 22 September. The climax was then very sudden: between then and 30 September there are dated records of about 700, with a further 100 in the first week of October, the last two being caught on 19 October and 9 November at Bradwell-on-Sea, Essex. This sudden abundance was at first thought to be due to massive local breeding such as took place in 1947 in stubble fields. But its extreme concentration in date, along with many other immigrants, its very wide geographical distribution, and the very small numbers found by day, together suggest very strongly that its main cause was a huge immigration which reached its height on 26 and 27 September, though local breeding may have made some contribution in some places where, as particularly near the south coast, the species had been seen in numbers in late July and August.

The story of *A. convolvuli* differs in several respects. The first was noted surprisingly far north in Westmorland/Furness on 17 June, and the second half of July there were single records in West Cornwall, Dorset and of two in East Kent. A larva found at Woodnesbury E. Kent, on 23 August and three pupae on 3 and 9 September at Otterton, S. Devon, presumably resulted from this small immigration and gave clear indication of potential local breeding. This probably contributed to the regularity of the recorded sightings, which from 15 August to well into October were almost daily and in numbers. A large proportion were seen at Nicotiana blossoms in the same places on successive nights and some at rest by day, so that the recorded total of about 500 may have considerable double-counting; in Lincolnshire, however eight caught singly at light near a bed of Nicotiana were released and none were recaptured, having presumably moved elsewhere. Eggs were found on *Convolvulus arvensis* in Cornwall in late August, and a last instar larva at Driffield, York-

shire on 19 September, so that some of the October adults may also have been bred locally.

The range was very wide. The species was clearly most abundant in Cornwall, Devon and Sussex, but it was seen, sometimes in numbers, near the east coast to Yorkshire and up the west of Caernarvon and Furness and in seven English vice-counties; in Scotland one was found on a ship which moved among the Orkney islands, and nine were reported in various islands of Shetland. We have records from five Irish counties, and one of particular interest from the oceanographic research ship "Challenger", on which one *A. convolvuli* was caught 24 September and two on 26 September after flying round the rigging at 9.30 hrs. 100/150 miles south west of Mizen Head. These provide a direct proof that when on migration the species flies in day light.

There were distinct and probably migratory peaks corresponding with those of other immigrants in the last weeks of August and September and apparently coming from the south and south west; but the records in Lincolnshire, Yorkshire, and Shetland were most, though not all, in early September and may reflect a separate flow of immigrants from the east or south east. There is at present no information available about the migratory pattern on the Continent.

The common immigrant moths were all more numerous than usual, though estimates of totals covered by the often generalised reports cannot be attempted. *N. noctuella, A. ipsilon, A. gamma,* and *P. xylostella* all began to arrive in small numbers in late April and early May, and they were joined by *U. ferrugalis* in early June; but they were widely reported as being scarcer than usual until the large general immigration in the last week of July. Light traps near the south and east coasts showed their highest peaks mostly in the third week of August and later, the largest being 1590 *A. gamma* trapped on Achill Island on 19 August, 1160 *A. gamma* and 110 *A. ipsilon* at Portland on 23 August, and 220 *N. noctuella* at Fountainstown, co. Cork on 5 September; all these also shared in smaller numbers in the large immigration at the end of September. Between these influxes almost continuous records were provided in many places by survivors and by offspring of earlier immigrants. Records inland were much smaller but more even in numbers; they may have included a higher proportion of locally bred examples, particularly of *A gamma. U. ferrugalis,* however, was reported only at the time of the immigrations and seems to have been most numerous as late as September, and again in early November. All species reached as far north as Orkney, except *U. ferrugalis,* of which the northernmost record received is of a single from Dunbartonshire. The diurnal *M. stellatarum* with some 300 reported was also very widespread and there were also many, records of its larvae.

The number of recorders has again increased considerably, and we warmly thank all those who have contributed, whether directly,

or indirectly through county or other collective reports. The general coverage of the country has much improved, though it is still uneven. We should particularly welcome more information from regular light traps recording in West Cornwall, which is probably the most important point of arrivals for many immigrants, from inland localities generally, and from Scotland and Ireland. We also thank Mr. P. A. Davey for his help on meteorological probabilities for arrivals of immigrants during September and October.

(To be continued)

COPPER UNDERWINGS AMPHIPYRA PYRAMIDEA L. AND A. BERBERA SVENSSONI FLETCHER IN BEDFORDSHIRE. – From the literature I see it is 16 years since it was recognised that two separate species of Copper Underwing exist in this country. This year I attempted for the first time to separate them using the characteristic differences in the undersides described by Goater and Christie (in *Ent. Gaz.* Vol. 20). I feel my observations may be of interest at least to those, who like me, have never tried to determine which of the two species they have seen.

Copper Underwings can be very numerous at sugar and the first site I sugared produced around 100 to 150 a night in late August. My first samples of the smartest, freshest looking moths, when examined at home, showed no differences, and all matched the characteristics of *Amphipyra pyramidea* L. Only when I started taking the dull, dowdy looking moths, was *A. berbera svenssoni* Fletcher revealed to me. After that it all seemed easy! Having got a "feel" for the two species it seemed that torchlight enhanced the differences and I was able, with a high degree of success to tell the two apart from the upperside appearances alone – on the spot, at the sugar patch.

A. pyramidea appears a much more handsome and contrasty moth than *A. berbera*, presenting a very "black and white" appearance in the beam of a torch, whilst *A. berbera* appears drab and exhibits little contrast.

At the first site the ratio of *pyramidea* to *berbera* was in the order of 7:3 but at a second Bedfordshire location the situation was reversed with *berbera* being the more numerous, again at about 7:3. Both species are obviously very common in Bedfordshire. – K. F. WEBB, 2 Kingsdown Avenue, Luton, Beds LU2 7BU.

SESIA BEMBECIFORMIS HBN.: LUNAR HORNET MOTH IN BEDFORDSHIRE. – On 26 December 1983 whilst cleaning out a cage, I discovered a specimen of this moth, which I had missed at the time of emergence. The insect was reared from a section of a 60mm. diameter sallow trunk and was taken from a small colony I had found in South Bedfordshire. This is apparently the first recorded *S. bembeciformis* for Bedfordshire since Victorian times. – K. F. WEBB, 2 Kingsdown Avenue, Luton, Beds.